

CLAIMS

1. Cable (1) comprising an outer protective sheath (2) and optical means for monitoring temperature and strain, said optical means being within said outer protective sheath (2) and comprising:
 - 5 - a first tube (4) including at least a first optical fibre (8) in order to monitor the temperature, said first optical fibre (8) being loose in said first tube (4) and comprising at least one reflecting section called Bragg grating (16),
 - 10 - at least a second optical fibre (7) including at least one Bragg grating (16) in order to monitor the strain,
 said cable (1) being characterized in that said second optical fibre (7) is outside said first tube (4), said optical means further comprising means (6) for tightening said second optical fibre (7).
2. Cable (1) according to claim 1 characterized in that said second optical fibre (7) is centrally located along the longitudinal axis of said cable (1).
3. Cable (1) according to claim 1 or claim 2 characterized in that said first optical fibre (8) has an excess length in said first tube (4).
4. Cable (1) according to any one of claims 1 to 3 characterized in that said first tube (4) is stranded.
- 20 5. Cable (1) according to any one of claims 1 to 4 characterized in that it comprises a stranded layer including a plurality of strands (3, 4), one of said strands being said first tube (4).
6. Cable (1) according to any one of claims 1 to 5 characterized in that said first tube (4) comprises a plurality of optical fibres.
- 25 7. Cable (1) according to any one of claims 1 to 6 characterized in that said means for tightening said second optical fibre (7) are a second tube (6) separated from said first tube (4).
8. Cable (1) according to claim 7 characterized in that said second tube (6) comprises a plurality of optical fibres.
- 30 9. Cable (1) according to any one of claims 1 to 6 characterized in that said means for tightening said second optical fibre are a coating layer

surrounding tightly said second optical fibre in order to form a tight buffered fibre.

10. Cable (1) according to any one of claims 1 to 9 characterized in that at least one of said first or second optical fibre (8, 7, F) comprises a plurality of Bragg gratings (16) disposed at different locations along the length of said first or second optical fibre, each of them corresponding to a monitoring spot.
11. Cable (1) according to any one of claims 1 to 10 characterized in that said means for tightening said second optical fibre are surrounded by a protective jacket.
12. Cable (1) according to any one of claims 5 to 11 characterized in that one of said strands (3, 4) is a strength member (3).
13. Cable (11) according to any one of claims 5 to 12 characterized in that one of said strands is a conductor (13).
14. Cable (1) according to any one of claims 1 to 13 characterized in that at least one of said first or second tube (4, 6) is made of metal.